

Technical White Paper

# WO Analytics ETL Benefits

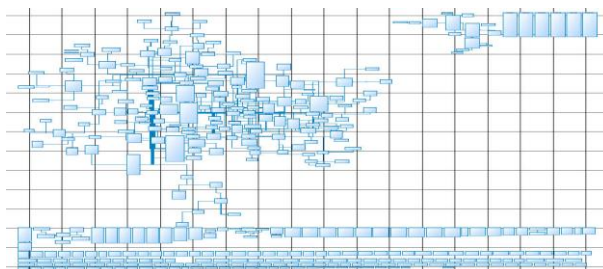
## Introduction

In this document we outline the benefits of the *WO Analytics ETL* – this is a product that provides all the data elements of *WO Traffic* and/or *WO Network* to any external system in a fully normalized ready to use format. If you are building a data warehouse and/or a high end predictive or prescriptive analytics system for pricing, optimization, etc. this would be a perfect solution for you. The solution is part of our advanced business intelligence (BI) offering called *WO Analytics* and provides you with a single aggregation of all data from different WideOrbit systems and related external systems. Most of the heavy engineering and development over the last 5+ years on the *WO Analytics* team has gone into building a scalable ETL process and a robust data warehouse/data lake for *WO Analytics*. In fact, most of the value of *WO Analytics* is in this back end, which makes it easy for users to build new reports using the front end tool of their choice (we prefer and resell Tableau in our business intelligence solution). Several large customers have invested in this approach and WideOrbit has experience bringing together data from multiple systems and exporting it to corporate Data Warehouses, Revenue Analytics systems, etc.

## Background

A number of WideOrbit customers have their own BI solutions – these could range from home grown efforts using SQL Server and SSIS to large data warehouses using tools like IBM's Cognos, SAP Hana, Snowflake, etc. In this document we will describe the benefits of *WO Analytics* back end, which can then complement these tools/products or replace them in some cases for much lower overall cost.

Building your own ETL from *WO Traffic/WO Network* is hard because these database schemas are optimized for transactions, not reporting or Analytics. Extracting data from this system requires thorough knowledge of the database schema and the complex inter relationships. The *WO Traffic/WO Network* database schemas also keep changing as WideOrbit adds new features/functionality to these systems. And as acquisitions happen, we find that many customers have multiple *WO Traffic* and *WO Network* systems. Here is a typical *WO Traffic* database (*WO Network* has even more complexity) – each box is a table and lines show relationships between tables:



Over the years some customers have built processes to export Revenue summary data directly from *WO Traffic/WO Network*. Today we have a technology/service called the WideOrbit Data API which supports these types of data exports. Once the data is exported, you have to do your own “joins” and then it can be stored in any Data Warehouse of your choice. But due to the inherent complexity and size of this data export, most teams do not dive deeper into the data. For example, detailed analysis of Spot level data, Financial Adjustment data, detailed Pacing history, Inventory capacity analysis, Invoices, Payment history, etc. is very hard to get to and the volume of these data sets and execution times for these exports can get very large. This is because each of the conceptual “fact tables” above is stored in a different way and you will have to develop separate, scalable ETL processes for each. You also need a deep understanding of the *WO Traffic/WO Network* database which also changes over time.

Finally one has to account for large scale changes to past orders/spots (usually done using Database scripts or mass updates) that are sometimes applied to these databases – this may make a lot of the old data you have collected invalid/wrong and you must develop a process to fully refresh the data from the *WO Traffic/WO Network* database.

Since rolling out *WO Analytics* in 2012 some of our early customers had their own active BI projects which proved unviable in the longer term and they subsequently shelved these in favor of using *WO Analytics*, which has matured and grown steadily over the last few years. So, we are now excited to offer *WO Analytics ETL* as a separate product offering.

Another huge benefit we have provided is a seamless integration of **multiple** *WO Traffic/WO Network* systems into one “data lake”. This is needed when companies acquire other properties which may be running *WO Traffic/WO Network* also. Here we need to not only bring the data into the common database but also ingest “mappings” of the various business elements e.g. Sales Regions, Product Categories, etc.

In some cases, we have also brought in historical data from other Traffic/Deal Management systems.

Our largest customers have multiple *WO Traffic* and *WO Network* systems each running different versions (sometimes across TV and Radio) and we have unified the data, mapped all the business elements and kept the system up to date across multiple *WO Traffic/WO Network* releases. New *WO Analytics* releases also add more data and more features to our ETL, our data sources and dashboards. Every customer of *WO Analytics* and each of our business sponsors will heartily recommend our software.

## WO Analytics Back End

Sometime around 2012, the *WO Analytics* team was formed to build a robust ETL process to bring together data from many of the WideOrbit product databases and any relevant external systems into a newly designed *WO Analytics* data warehouse. Later that year, WideOrbit partnered with Tableau, a global leader in Business Intelligence solutions, to embed their products into our pre-built BI solution – *WO Analytics*. *WO Analytics* defines and maintains a rich but business user-friendly Analytics schema. Using Microsoft SQL Server and Tableau data sources, the final result is a set of published data sources that can be used to build dashboards/reports and/or the data can be exported to other systems. There are 2 types of data sources:

1. The database layer brings in data from multiple *WO Traffic/WO Network* systems and/or other WideOrbit and non-WideOrbit systems. It provides a rich business mapping layer and defines flat “Data Views” which can be used by many different front-end systems
2. Our Tableau data source layer further builds on these database “data views” and adds media industry business semantics e.g. we have ready-made formulas for Current/Prior Year Pacing, Dollars added this week in Current/Prior year, formulas for Billable Revenue, Preempted Revenue, Credited Revenue, etc. which then can be based on a Broadcast or Gregorian calendar.

We have chosen to extract and save the most granular level data possible. This consists of various low-level objects like Spots/Units, Sales Activity history, Inventory capacity, Payment history, etc. We then aggregate this information in a useful way for Broadcast industry analysts.

*WO Analytics ETL* product consists only of the backend of *WO Analytics* – there is no Tableau server, Tableau desktop or core value added Tableau dashboards. These can be added at a later date if needed.

Described here in more detail are some of the features of this back end:

- Many fully defined, simplified and flat analytics-friendly data sources (database views) are available. Business users can use these immediately to build their own reports and dashboards. For example, we have a data view that combines Spot data with Financial adjustments and further allocates Spot Revenue to individual AEs.
- As part of the implementation of *WO Analytics*, several “standard data imports” are defined, loaded and/or configured for use. This allows you to augment *WO Traffic/WO Network* data in meaningful ways and also bring in common external data. These include:

- Station/Property Budget / Forecast data imported using a pre-defined .csv file format (for example, this could come from your CRM system)
  - Station / Market / Property extended information
  - Key or Watched Inventory codes e.g. Superbowl or Olympics Inventory codes
  - Pacing Groups e.g. Core Local, Core National, Political, Digital
  - Simple custom External Data, defined and imported using *WO Analytics* Admin Tool
- 
- In addition to all the above, we support custom data Import as well and your customizations are maintained across new releases and upgrades of *WO Analytics*. For example, you may decide to import Sales Opportunities from a CRM system like SalesForce.com or Matrix. Additionally, historical revenue or pacing data from OSI or Matrix can be imported as well as historical deal data from DealMaker when you convert to *WO Traffic/WO Network*.
  - *WO Traffic – Digital Orders* data is automatically imported and available
  - *WO Program* cost-per-episode data is imported and available (this feature is part of *WO Analytics* 4.0 expected in July/Aug 2019)
  - We support import from multiple *WO Traffic/WO Network* systems in case you have more than one system active or want to bring in historical data from an older *WO Traffic/WO Network* system
  - Daily automated data integrity checks comparing data in *WO Traffic/WO Network* with *WO Analytics* data. Any discrepancy is accounted for and/or fixed if needed
  - Managed updates to ETL code when *WO Traffic/WO Network* upgrades are installed, to make sure system keeps running smoothly
  - Daily and weekly pre-built, managed and monitored daily ETL processes
  - Support to trouble shoot any data discrepancies - ETL patches are made immediately if and as needed
  - Fully managed *WO Analytics* upgrades – this is for new releases of *WO Analytics ETL* package. Includes full testing on a test server before deployment on production

Getting to this level of maturity and robustness has not been easy. We continue to grow and improve the product – in terms of speed, volumes, functionality, etc. with active input from all our customers. And even though we are within WideOrbit, we have had to keep learning about the nuances of the *WO Traffic/WO Network* and other WideOrbit databases, which keep changing.

## Summary

In summary, *WO Analytics ETL* is a ready-made data export tool for WideOrbit systems and it offers the following major benefits:

- Complete data export for *WO Traffic*, *WO Network*, *WO Traffic–Digital Orders* and *WO Program*
- A ready-made data warehouse database with Analytics friendly data views for use with any Business Intelligence front end tool
- Custom data import for historical data (from all *WO Traffic/WO Network* DBs). This includes a complete and robust business data mapping layer
- Import other related data e.g. Budgets and Forecasts from your CRM system
- Access to complete and detailed granular data. Our ETL has 2 modes:
  - Full ETL on weekends brings in full fact data for last 5 years. This is useful when scripts are run on *WO Traffic/WO Network* database or changes made to the way Properties are set up, etc. It also brings in changes made to older data records.
  - Incremental ETL on weekdays brings in data that changed each day
- Overnight and weekend monitoring by WideOrbit personnel – team will restart process, debug connectivity issues and complete manually if needed (if they are granted the required permissions).
- Any major problems with ETL usually debugged and fixed in 1 day
- ETL code maintained across *WO Traffic/WO Network* releases and upgrades
- New fields added in *WO Traffic/WO Network* added to ETL and published Data Sources on a periodic basis
- Rich media-friendly star schema and media-friendly data views with pre-built joins and logic
- All Dimension data available
- Granular fact data from *WO Traffic/WO Network* available with no extra code to write. Other commonly used external data also available. This includes:
  - Spot/unit level data allocated to multiple AEs if present
  - Financial adjustments

- Pacing
- Inventory
- Log
- Invoices
- Payments
- Opportunities from CRM systems
- Budgets from Financial or CRM system (or *WO Traffic/WO Network*)
- Deal level data for Network (Impressions, Details, Rate Card)